SR 9
ENVIRONMENTAL ASSESSMENT / CORRIDOR STUDY

FINAL REPORT

Prepared for:

INDIANA DEPARTMENT OF TRANSPORTATION

And

FEDERAL HIGHWAY ADMINISTRATION

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EXECUTIVE SUMMARY

Overview

The study of Indiana State Route 9 (SR 9) in and around the City of Greenfield in Hancock County, Indiana is sponsored by the Indiana Department of Transportation (INDOT) and the Federal Highway Administration (FHWA). Initial earmark funding was listed as a line item in the 1998 TEA-21 legislation, Section 1602 Program for High Priority Demonstration Projects and as a line item in the 2005 SAFETEA-LU transportation bill.

The ten-mile-wide study area encompasses fourteen miles of SR 9 from US 52 north to SR 234 and is centered on the City of Greenfield (Figure 1). SR 9 is classified in INDOT's 2001-2025 Long Range Plan as a Regional Corridor.

The study is being directed by a management team of INDOT and FHWA through their consultant Paul I. Cripe, Inc. Stakeholder participation was coordinated through a Citizens Advisory Committee (CAC) comprised of local government officials, economic development groups, local businesses, neighborhood groups, and other interested parties in the Greenfield and Hancock County areas. Public meetings were held in Greenfield to elicit general public comment.

The study is being conducted as an Environmental Assessment (EA) / Corridor Study in accordance to FHWA's *Indiana's Streamlined Environmental Impact Statement (EIS) Procedures.* The general purpose of this overall study is to establish the central purpose and need for improvements along the corridor, develop and analyze alternatives which will meet the purpose and need, and make recommendations for projects of independent utility (if any) which should be programmed for future development and study. Those projects identified for future development will be subject to further evaluation in the NEPA process as required (EIS, EA / FONSI, CE).

Statement of Purpose and Need

Based on an assessment of purpose and need, the underlying need for improvements along the SR 9 corridor is based on forecasted deficiencies in overall service levels, and a current need to improve safety. Level of service (LOS) analysis of segments and major intersections of SR 9 through the corridor indicated the roadway is currently operating generally at minimum acceptable levels. Accident rates are markedly higher than statewide rates for the more urban portions of the corridor.

The primary purpose and need of selected improvements should achieve the following objectives and evaluation criteria:

- Improve Level of Service through the entire existing SR 9 corridor within the study area to desirable levels through the design year 2025

- Improve safety along the existing SR 9 corridor

The Statement of Purpose and Need identified alternatives which fell into four conceptual or preliminary "families":

- "No Build" (i.e. non-State system improvements)
- Minor Improvements to Existing SR 9
- Major Improvements to Existing SR 9
- Greenfield Bypass

Alternatives Analysis and Screening

The alternatives analysis was a two-stage screening process: primary screening and final screening. The primary screening process was established to detect any fundamental flaw (cost, engineering, environmental factor) or failure to meet the primary purpose and need requirements and goals. Groups of alternatives were refined further from the families established in the Statement of Purpose and Need:

- **Group 1:** No Additional Action (only existing programmed projects and maintenance would be implemented)
- **Group 2:** Major Off-system Local Improvements (State System No-Build)
- **Group 3:** Minor Improvements Along Existing SR 9
- **Group 4:** Major Improvements Along Existing SR 9
- **Group 5:** Major Off-Route Improvements

Because the primary purpose and need of alternatives was to improve level of service (LOS) and improve safety, the measure of these criteria was determined by analyses of forecast traffic volumes and resultant roadway capacities. A computational model based on the study area's traffic and roadway network was utilized to determine the traffic volumes on SR 9 for new alignments.

A draft document of the Preliminary Alternatives Report related to the groups above was submitted for review. The review and decisions made by groups on conceptual alternatives involved an Interagency Coordination Meeting (December 19, 2002), a Community Advisory Committee (CAC) meeting (September 23, 2002), and a Public Information meeting (September 23, 2002), all held in

Greenfield (See Appendix A for meeting minutes.) Based on input from these meetings and as a result of additional network modeling, alternatives within the five groups noted above were developed and modified.

These alternatives were coordinated with the Central Indiana Suburban Transportation and Mobility Study (CISTMS), pronounced "Systems", to ensure that there would be no duplication of projects.

In addition to evaluating regional transportation improvements, CISTMS studied improvement strategies specific to SR 9 in Greenfield. The study noted that, since opportunities for adding travel lanes through Greenfield were limited, an SR 9 bypass was tested to evaluate the effect on traffic congestion. Analysis revealed that the volume of diverted traffic did not warrant construction of the bypass, indicating that many trips on SR 9 have an origin and destination in Greenfield.

During the screening process, a new group of alternatives came about as a result of observing truck traffic patterns in the Greenfield area and research on truck traffic control implemented in other Indiana cities.

- **Group 6:** Minor Off-Route Improvements with Truck Traffic Control (State System No-Build)

The second stage of the analysis was the final screening of alternatives. This stage of the process involved detailed engineering and an environmental overview of the retained and modified alternatives brought forward from the primary stage.

The alternatives were compared in order to identify potential recommendations. A total of 7 alternatives were examined for final screening:

- **L-11:** Creating a one-way pair of north-south roadways and providing major on-route improvements north and south of the one-way pair.
- **GHI:** Providing additional travel lanes to three segments of SR 9 to attain capacity.
- **E1:** Providing a 6.0-mile bypass east of Greenfield, from SR 9 near CR200S to I-70.
- **L1-T:** Providing corridor improvements to Meridian Street Corridor from New Rd. to US 40 and S. Franklin Rd. from US 40 to Davis Rd. and truck traffic control. Improvements will also be made to New Rd. and Davis Rd. connecting the Corridor to SR9.
- **L2-T:** Providing corridor improvements to Franklin Street Corridor from New Road to Davis Road and truck traffic control. Improvements will also be made to New Rd. and Davis Rd. connecting the Corridor to SR9.

- **L3-T/L4-T**: Providing corridor improvements to CR400E Corridor from Davis Road to New Road and truck traffic control. Improvements will also be made to New Rd. and Davis Rd. connecting the Corridor to SR9.
- **L5-T**: Providing corridor improvements to Blue Road Corridor from US 40 to New Road and S. Morristown Pike Corridor and truck traffic control. Improvements will also be made to New Rd. and Davis Rd. connecting the Corridor to SR9.

Recommendations

Based on the results of the screening and evaluation process, and the funding constraints put forth, there are no viable "build" alternatives within the state system that can be recommended for further study. Therefore, the **No Action** alternative, no additional actions aside from existing committed (programmed) projects on either State or local roadway systems, is the recommended alternative.

This is not to say that there are no solutions. The truck traffic rerouting alternatives may be viable solutions as a project developed by a local entity and supplemented by transportation enhancement funds, a LPA 25% match, or innovative financing:

- Alternative L1-T: Improving the Meridian Street Corridor from new Road to US 40 and South Franklin Road from US 40 to Davis Road and Truck Traffic Control.
- Alternative L5-T: Improving the CR400E Corridor from Davis Road to New Road and Truck Traffic Control.
- Alternative L3-T/L4-T: Improving the Blue Road Corridor from US 40 to New Road and S. Morristown Pike Corridor and Truck Traffic Control.

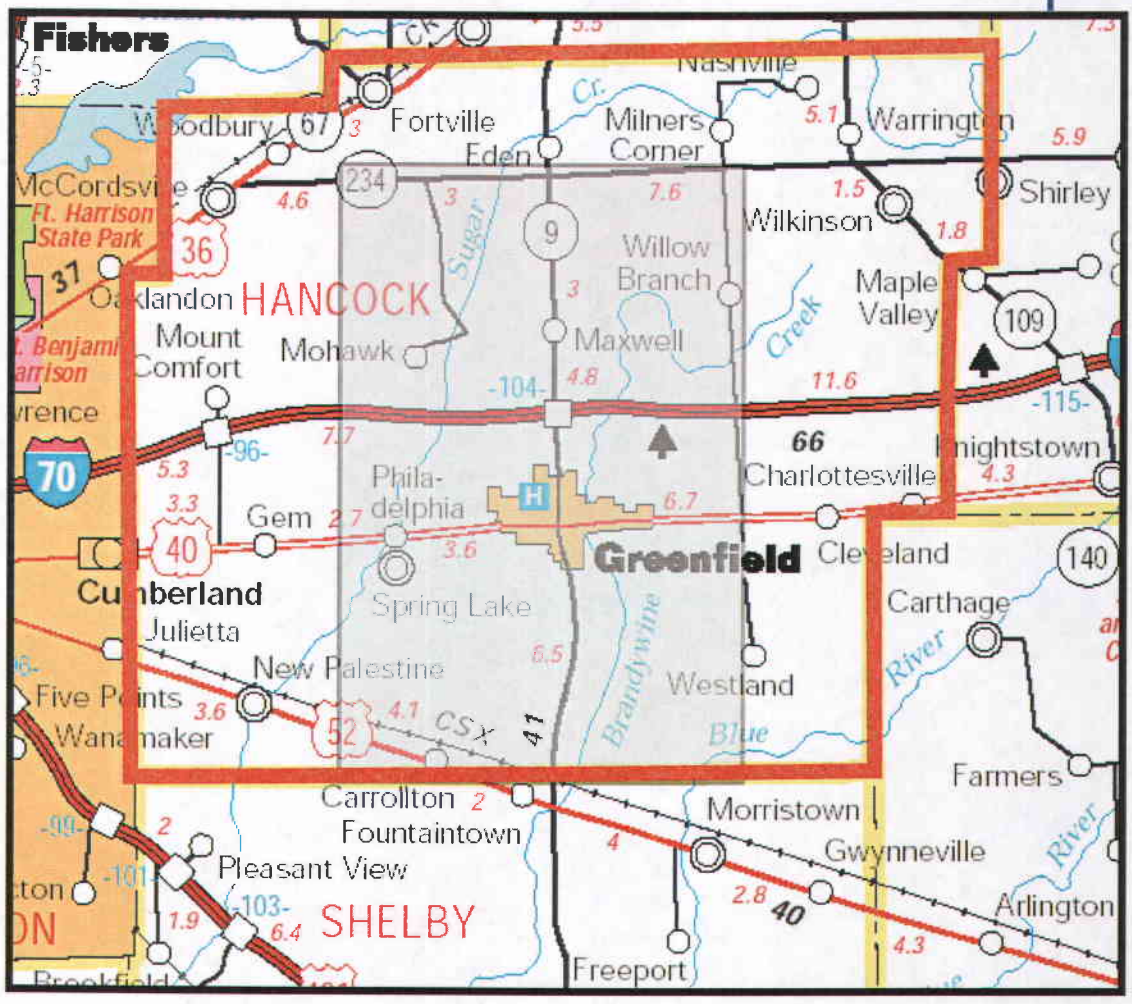

Figure 1 - Project Location Map

STATEMENT OF PURPOSE AND NEED

EXISTING CONDITIONS

This section of the Statement of Need and Purpose document outlines the information used in the assessment of the purpose and need for possible improvements to the SR 9 corridor. Included is a description of the study area, including the major roadways, land use, and environmental conditions, the performance of the existing roadway system, including present and future traffic volumes, and a summary and discussion of other projects and / or studies which may have an impact on the formation of the need and purpose statement.

STUDY AREA LOCATION

SR 9 traverses the state from its southern terminus at SR 46, east of Columbus to the Indiana-Michigan border in LaGrange County for a total length of 195 miles. For most of this length, the roadway is classified in INDOT's Long Range Plan (2000 -2025) as a *Regional Corridor*. A *Regional Corridor* is the middle tier of the highway system and is meant to provide mobility within regions of the state. These facilities are meant to provide safe, intermediate speed connections. Typically, medium distance trips are served along these moderate speed facilities.

The area of SR 9 from US 52 to SR 234, representing the Greater Greenfield area, will serve as the subject of this study. (Figure 1)

(The initial scope of the study is limited to addressing possible improvements along SR 9 in and around the City of Greenfield and will serve as the basis for establishing the limits of the study. Regional mobility issues beyond the effective influence of the city along the corridor, such as movements north toward Anderson, or south toward Shelbyville, are considered peripheral to this study, and may be considered as part of a separate study at a later date.)

PHYSICAL ROADWAY SYSTEM / SYSTEM LINKAGE

The study area is served by several levels of roadways, including Interstate, US, State, and Local roadways. SR 9 serves as the primary north-south roadway, through the study area, while US 52, US 40, I-70, and SR 234 serve east-west movement through the area.

SR 9

SR 9 through the study area is a 14.5 mile section of roadway. From the southern terminus of the study area at US 52, north through US 40 to McKenzie Road (CR 100N), a length of approximately seven miles, SR 9

is a two lane roadway. From McKenzie Road, north to I-70, a distance of 1 ½ miles, SR 9 widens to a five lane section, consisting of two travel lanes in each direction with a two way left turn lane. The final 5 ½ miles of SR 9, north of I-70 to SR 234 is again a two lane roadway. Intermittent dedicated left and right turn lanes exist at major intersections. Ten signalized intersections exist within the corridor, all located between US 40 and I-70.

Speed limits along the corridor are generally between 30 and 45 mph from CR 100S, north through the limits of Greenfield to I-70. North and south of this area the speed limit is 55 mph.

Major roadways which cross SR 9 through the study area and affect its overall operation include (listed from north to south):

SR 234

SR 234 is a regional two lane, east west *Rural Major Collector* extending from McCordsville to New Castle and forms the northern boundary of the study area. This facility generally carries approximately 2,500 AADT.

I-70

Interstate 70 through the study area is a four lane, east-west divided freeway traversing the entire state and nationally extending from Maryland to Utah. I-70 is on the National Highway System and the National Truck Network. Traffic volumes along I-70 near SR 9 are near 47,000 AADT.

US 40

US 40, through the study area, transitions from west to east as an east-west *Urban/Rural Principal Arterial* to an *Urban / Rural Major Collector* The roadway extends through the entire width of the state and nationally from Maryland to Utah. US 40 is not on the National Highway System, but is on the National Truck Network. US 40 is a National Scenic Byway and carries 14,000 vehicles per day in the study area

US 52

US 52 is a northwest-southeast roadway classified in the area as a *Rural Minor Arterial.* US 52 traverses the state from Dearborn County to Benton County and extends nationally from Charleston, South Carolina to Minneapolis, Minnesota. It is not on the National Highway System, but is on the National Truck Network. US 52 carries approximately 6,500 vehicles per day at its intersection with SR 9 and forms the southern boundary of the study area.

System Performance and Operation

Traffic Capacity and Demand

Existing (base year) traffic counts along SR 9 within the study area vary. Traffic counts taken by INDOT in 1999 reveal volumes ranging from between 7,500 and 8,000 vehicles per day at the north and south ends of the corridor. Traffic volumes peak to just over 26,000 vehicles per day near I-70. The existing corridor was separated into ten sections for detailed service analysis.

Table 1: Existing SR 9 Traffic Volumes

Segment	1999 Traffic Volume (AADT)	LOS
CR 600N – SR 234	7,790	C
CR 500N – CR 600N	9,680	C
CR 300N – CR 500N	10,420	C
I-70 – CR 300N	15,240	D
New Road – I-70	26,150	C
McKenzie Road – New Road	19,390	B
US 40 – McKenzie Road	17,110	D
Osage Street – US 40	14,180	E
CR 100S – Osage Street	11,020	D
CR 300S – CR 100S	8,120	C
US 52 – CR 300S	7,530	C

Note: Green shaded areas are within the Greenfield City limits.
Red shaded areas represent unacceptable Levels of Service (LOS)

The quality of traffic flow along the corridor was determined by examining the Level of Service (LOS) along several sections of the roadway. Roadway service is measured along a scale of A through F. An LOS of "A" represents an ability to maintain the posted speed, freely make all required movements, (passing, lane changes, etc.), and generally represents very good service. An LOS of "F" represents a complete breakdown of the highway system, such as in a stop and go condition. A Level of Service of "E" represents the point at which the roadway's volume roughly equals its capacity. INDOT standards identify an LOS of C and D as the minimum acceptable levels of service for a rural and urban corridor, respectively, such as SR 9.

Unacceptable LOS is currently being experienced along SR 9 in the one-quarter mile section between US 40 and Osage Street, demonstrated in Table 1.

Future (design year) traffic volumes were forecasted for along SR 9 for the year 2025.

Table 2: Future SR 9 Traffic Volumes		
Segment	**2025 Traffic Volume (AADT)**	**LOS**
CR 600N – SR 234	13,050	D
CR 500N – CR 600N	16,210	D
CR 300N – CR 500N	17,450	D
I-70 – CR 300N	25,530	E
New Road – I-70	43,800	C
McKenzie Road – New Road	32,480	B
US 40 – McKenzie Road	28,660	E
Osage Street – US 40	23,750	F
CR 100S – Osage Street	18,460	E
CR 300S – CR 100S	13,600	D
US 52 – CR 300S	12,610	D

Note: Green shaded areas are within the Greenfield City limits.
Red shaded areas represent unacceptable Levels of Service (LOS)

The LOS along SR 9 is anticipated to deteriorate in the future (2025) based on projected traffic volumes. Service levels which are unacceptable or approaching unacceptable are anticipated through most of the corridor, primarily in the two lane areas along SR 9 north and south of the current five lane section of roadway within the limits of Greenfield.

Major intersections within the corridor between US 40 and I-70 were also analyzed for their performance. An analysis of these isolated areas is helpful in identifying operational issues within the corridor.

Table 3 – Intersection Level of Service		
Location	*1999 LOS*	*2025 LOS*
SR 9 at US 40	**C**	**F**
SR 9 at McKenzie Road	**D**	**F**
SR 9 at McClarnon Drive	**A**	**B**
SR 9 at New Road	**C**	**F**
SR 9 at I-70	**B**	**C**

All major intersections are currently operating at acceptable levels of service. (It should be noted that the substandard intersection geometric elements, such as turning radius, are having an additional adverse affect on the current service levels, This affect is not reflected in the above chart. Improvements to the substandard elements may in some cases improve the LOS beyond the levels shown above. The quantitative increase in service levels will be contingent on the specific improvement made and the particular location of the improvement.)

Based upon future traffic projections, the intersections with US 40, McKenzie Road, and New Road will be at failure levels, with a projected LOS of "F".

TRAVEL MARKET

In order to evaluate the current users of SR 9, or its travel market, an origin-destination (OD) study was performed. (A summary of the methodology and subsequent results of the OD study is presented here. For a more in-depth discussion of the study and its results, refer to Appendix B of the report.) An OD study attempts to reveal from where (origin) and to where (destination) individual vehicles are traveling.

Based on traffic volumes taken as a part of the OD study, the average daily heavy vehicle volume entering or leaving the study area through the designated stations is approximately 4,500 vehicles. Based on the results of the study, on a daily basis, an average of 918 heavy vehicles, or approximately 20%, are making through movements through the entire study area. This indicates that 80% of the heavy vehicles entering or exiting the system have either originated in or are destined for points within the study area.

The results also reveal that of those 918 through movements, only 277 (1D – 123, 4A-154) can be classified as through trips in which the vehicle both entered and exited the system on SR 9. This value represents approximately 30% of the total through trips or only 6% of all heavy vehicle traffic in the area.

An analysis of passenger vehicle volumes displayed similar travel pattern results.

SAFETY

Traffic accidents (crashes) represent a risk to human safety. Accidents also involve a financial liability to the public through damage to private and public property and lost time from subsequent delays. Safety deficiencies can be analyzed through a study of accident rates at a particular location or through a particular area. High accidents rates can adversely affect the efficiency of a particular transportation system.

Data was compiled from INDOT's Program Development Unit and an independent study prepared in 1999 by the Greenfield Police Department. A study of accident data along SR 9 from US 52 to SR 234 between the years of 1997 to 1999, revealed a total of 726 crashes occurring in the study area. These 726 crashes involved 1,443 vehicles, 379 injuries, and 4 fatalities over the three year period. This indicates an annual average of 242 crashes involving 481 vehicles, 126.3 injuries, and 1.3 fatalities per year.

The corridor exhibits both rural and urban characteristics, which yield varying typical and actual accident data. Roadway speed, geometry, traffic volumes, and traffic composition all contribute to the difference in accident results. For the purpose of analysis, those areas within the limits of the City of Greenfield, roughly from I-70 south to approximately CR 200S, are considered urban in nature.

Table 5: Accident Data along SR 9 (1997-1999)

Year	Accidents involving Prop. Damage (Veh. Involved)	Accidents involving Injury (No. of Injuries)	Accidents involving Fatalities (No. of Fatalities)
1997	260 (511)	59 (106)	1 (1)
1998	227 (451)	77 (115)	0 (0)
1999	239 (481)	89 (158)	2 (3)
Total	726 (1443)	225 (379)	3 (4)
Annual Average	242 (481)	75.0 (126.3)	1.0 (1.3)

Table 6 – Accident Data- SR 9 from US 52 to SR 234 Average Annual Data (1997-1999)							
	Accidents Involving Prop. Damage		**Accidents involving Injuries**		**Accidents Involving Fatalities**		**Veh. Miles Traveled**
	Statewide Rate	SR 9 Rate	Statewide Rate	SR 9 Rate	Statewide Rate	SR 9 Rate	
Rural	199	197	50	39.5	2.0	2.6	*38,000,000*
Urban	417	709	93.5	333	0.7	0	*18,000,000*
Total	251	432	64	133.9	1.6	1.8	*56,000,000*

Note: Statewide Rate = Typical Statewide Annual Rates for Arterial Roadways (per 100 million vehicle miles traveled)

Shaded boxes indicate values exceeding statewide averages

Referring to Table 6, for the three year period from 1997 to 1999, the urban portions of SR 9 experienced higher than average annual property damage and injury rates, as compared to the values across the state. The rural accident and injury rates were lower along this segment of SR 9 than the statewide rate. (Due to the low number of "data" points, a true assessment of the fatality rate is not possible with any statistical certainty.)

Land Use / Socio-Economic - Environmental Profiles

The section of the SR 9 corridor under study generally is almost entirely within the limits of Hancock County and encompasses the entire City of Greenfield.

Greenfield was incorporated as a city and began serving as the Hancock County Seat in 1828. The city currently has approximately 14,600 residents, a 25% increase from the 1990 census.

Development of the city has expanded outward from its central business district centered around the intersection of US 40 and SR 9. Land use in this area is primarily high density commercial and residential, with existing hindering restricting further expansion of the roadways in the area.

The completion of I-70, approximately 2 ½ half miles north of US 40, encouraged growth in Greenfield to gravitate to the north. Many manufacturing and industrial related facilities are now located near this major transportation facility. Between the I-70 corridor and the downtown central business district, numerous strip malls and retail developments have been built.

Outside the limits of Greenfield, SR 9 runs through a primarily rural area, characterized by large tracts of agricultural land and rural residential neighborhoods. Over the past five years, residential subdivisions have begun to develop just south of the city along SR 9.

North of the city, within the limits of the study, SR 9 runs through the small town of Maxwell. Several subdivisions are slated for development along the north leg of SR 9, but land use is primarily agricultural.

PREVIOUS STUDIES / STUDY HISTORY

The City of Greenfield has previously requested assistance from INDOT to improve the SR 9 transportation corridor between I-74 and I-69. Most recently, in late 1997, a request was submitted to INDOT by then Greenfield Mayor Patricia Elmore to fund a bypass around the city, "to ensure the degree of congestion which has occurred in other fringe areas of the Indianapolis region does not occur [in Greenfield]"

Previous to this request, other requests had been made dating back to the 1970's, though a formal investigation of the merits for improvement had never been completed.

A more formalized report was prepared by a consultant for the City of Greenfield for Congressman Dan Burton's office in 1997. This report described the City's perception of SR 9 as a route carrying vehicles which were using the roadway as a means of travel from Shelbyville to Anderson, bottlenecking in Greenfield, and restraining the economic health of downtown Greenfield. The City proposed a bypass be constructed around Greenfield to alleviate the congestion caused by these vehicles using SR 9 for regional purposes. The proposed $21,300,000 bypass would begin near CR 300S, continue across I-70 and connect back to existing SR 9 at CR 400N.

In response to the 1997 study, and the subsequent congressional mandate, the subject of this current study was initiated as outlined in the 1998 TEA-21 legislation, Section 1602 Program for High Priority Demonstration Projects, under the item of "Construct a SR 9 Bypass in Greenfield". FHWA and INDOT have responded by investigating the need and purpose of any local improvements to SR 9 in the area of Greenfield only. The scope of the study is limited to local improvements, and will not involve a larger regional mobility study of east-central Indiana.

COMMUNITY /PUBLIC INPUT

A Citizens' Advisory Committee (CAC) was established at the beginning of the study to bring together those local groups which would like to be an active participant in the study. This dynamic group is made of representatives from local government, education, business, healthcare, homeowners, and historical groups. Two formal meetings and numerous one-on-one meetings were held with these groups to elicit comment and input into the formation of the need and purpose. A public meeting was also held to elicit additional information regarding the study or the community in general.

Opinions generally varied greatly through the public involvement process. Generally, the public and community expressed concern with the safety and congestion problems along SR 9. The perception is that the heavy trucks in the traffic stream are the cause. Considerable merit was placed on the lack of other quality north south corridors through the area as a potential deficies in the area's transportation system. Opinion varied on possible solutions, from local roadway solutions, to spot improvements along the existing SR 9 corridor, to entire new roadways to bypass the city

NEEDS ANALYSIS

This section of the Need and Purpose Statement reviews the existing baseline information about the transportation system (as outlined previously) and develops the underlying need (deficiencies), if any, for improvements to the corridor.

SR 9, in and around the City of Greenfield, is classified as a *Regional Corridor* for planning purposes and is functionally classified as both a rural and urban arterial roadway through the study area. To develop the overall project objectives along the corridor, a gap analysis was made between the existing system performance and the required needs of the transportation facility in the context of desired operational performance, conformance with local land use policies, and with perceived local user system functionality.

LEVEL OF SERVICE

Generally, a two lane roadway will begin to exhibit a breakdown in service levels as traffic volumes increase, contingent upon a variety of factors such as access points along the roadway (drives, side streets, etc.), speed, and traffic composition.

The area along SR 9 from McKenzie Road to I-70 is generally displaying acceptable levels of service for both existing and future volumes. This 1 ½ mile stretch of SR 9 currently has four through travel lanes as opposed to the remainder of SR 9 with only two travel lanes.

The area from McKenzie Road to CR 100S (Davis Road), basically in the two lane urban sections of SR 9, roughly within the limits of Greenfield, an increase in traffic, the presence of traffic signals, parking conflicts, and generally substandard geometric conditions are all combining to decrease service levels to unacceptable levels. The residential and commercial growth of rural areas south and north of the city may cause SR 9 to lose operational efficiency as access points into new developments and traffic volumes increase. Passing and turning movements will become more difficult, and speeds will generally decrease. As shown earlier in Table 2, it is anticipated that levels of service will be at the minimum acceptable levels in 2025.

SAFETY

The section of SR 9 within the study area has experienced a safety record, based on accident data, which has been at or worse than the statewide average in recent years. The annual rate of property damage and injury accidents are higher than the statewide average for similar urban facilities. A number of factors may be contributing to this situation. On the rural portions of the corridor, safety records indicate accident and injury levels near statewide averages.

The Greenfield area experienced fairly rapid population growth through the 1990s. An influx of new development has occurred, and, on a number of accounts, the existing transportation system through the area has not grown at the same rate.

In the urban areas of Greenfield, dated geometrics, such as narrow lanes, substandard turning radii, and lack of turn lanes are contributing to relatively high accident rates. There is a particular frequency pattern of accidents at the intersections of SR 9 and US 40 and SR 9 and McKenzie Road. In the rural areas, north and south of the city, accident rates can also be attributed to recent growth in the area. Specifically, many portions of SR 9 which previously could be traversed at high speeds, are now experiencing varying degrees of roadside development, primarily in the form of residential subdivisions. These developments add entering and existing traffic flows onto the roadway, interrupting high speed traffic flow. Insufficient or lack of such roadway elements such as turn lanes or passing blisters to accommodate this pattern of traffic flow, creates potentially unsafe traveling conditions, increasing the rate of accidents in the area.

LOCAL MOBILITY

The local community, through previous coordination with INDOT and through CAC and public info meetings, as part of this study, has expressed a concern that the use of SR 9 as a through route corridor is adversely affecting their community by drawing truck traffic into the downtown area. More specifically, the community believes this truck traffic is excessive and utilizes SR 9 as a major north-south corridor for trips originating and terminating outside the Greenfield area.

The Greenfield area has three major non-local (city or county jurisdiction) transportation routes which provide local, regional and national accessibility to the area. Two of these roads provide east-west movement, namely I-70 and US 40. SR 9 is the only major north-south roadway in the area. All three are state-jurisdictional facilities.

Since SR 9 through the study area serves as the only major north south roadway, it tends to carry local traffic destined into, out of, or within the Greenfield area. It also serves as a north-south corridor for regional traffic from other primary statewide corridors, such as the aforementioned I-70 to the north of Greenfield or I-74 to the south.

SUMMARY

It is anticipated that the SR 9 corridor from US 52 to SR 234 will experience a decrease in service levels as the City of Greenfield and surrounding area continues to experience growth. Currently, accident rates are higher than the statewide average in the urban area and near the statewide average in the rural areas. The lack of other major north-south corridors serving the area, other than SR 9, is contributing to the existing SR 9 roadway exceeding its capacity.

Improvements along the corridor should attempt to address the following primary issues:

- ***IMPROVE LEVELS OF SERVICE IN BOTH THE RURAL AND URBAN SECTIONS OF THE SR 9 CORRIDOR FOR PROJECTED 2025 TRAFFIC VOLUMES***
  - Improve LOS values to "C" or better in rural areas
  - Improve LOS values to "D" or better in urban areas

- ***IMPROVE SAFETY ALONG THE EXISTING SR 9 CORRIDOR***
  - Reduce predicted property damage, injury, and fatal accident rates along the corridor to below statewide averages

PRELIMINARY ALTERNATES AND NEXT STEPS

The purpose of this section is to outline, at a conceptual level, the range of possible alternatives which will meet the primary need for improvements along SR 9.

Alternatives to address the primary and secondary needs along SR 9 in Greenfield fall into four conceptual or preliminary "families":

Alternate Group 1: Greenfield Bypass

This alternate would contain options for constructing a new north-south roadway to by-pass the city. The new roadway would be on the state system as a relocated SR 9

Alternate Group 2: Major Improvements to existing SR 9

This option would entail major improvement projects, roadway expansion in the form of adding through travel lanes to the existing SR 9 roadway.

Alternate Group 3: Minor Improvements to existing SR 9

Isolated improvements such as intersection improvements, median or turn lane additions, channelization modifications, or signal timing improvements, or more general geometric improvements through the entire existing SR 9 corridor may be typical of improvement options found in this category of alternates.

Alternate Group 4: "No Build" (i.e. non-State system improvements)

Alternates not on the State system will be examined. These alternates might include:

- improvements to existing, or development of new, city or county routes
- no additional actions aside from existing committed (programmed) projects on either State or local roadway systems

Additionally, the phasing of particular alternatives will be addressed, recognizing the preferred solution may be a combination of alternatives built at various times to address need in both the short term and long term.

A screening process was developed to measure the effectiveness of the those alternatives which are developed. The purpose of the alternative screening process was to narrow all alternatives down to those which meet the selected criteria, including purpose and need, and should be developed for further study. Screening criteria through which alternatives were evaluated included:

- Purpose and Need Fulfillment
- Environmental impacts
- Social / Community impacts
- Construction Cost

ALTERNATIVES ANALYSIS AND SCREENING

Overview

The Statement of Purpose and Need identified alternatives to address the needs along SR 9 in Greenfield. These alternatives fell into four conceptual or preliminary "families":

- **"No Build" (i.e. non-State system improvements)**
  Alternatives not on the State system will be examined. These alternatives might include:
  - improvements to existing, or development of new, city or county routes
  - no additional actions aside from existing committed (programmed) projects on State or local roadway systems

- **Minor Improvements to Existing SR 9**
  Isolated improvements such as intersection improvements, median or turn lane additions, channelization modifications, or signal timing improvements, or more general geometric improvements through the entire existing SR 9 corridor may be typical of improvement options found in this category of alternates.

- **Major Improvements to Existing SR 9**
  This option would entail major improvement projects, roadway expansion in the form of adding through travel lanes to the existing SR 9 roadway.

- **Greenfield Bypass**
  This alternate would contain options for constructing a new north-south roadway to by-pass the city. The new roadway would be on the state system as a relocated SR 9.

Additionally, the phasing of particular alternatives will be addressed, recognizing the preferred solution may be a combination of alternatives built at various times to address both the short term and long term need.

Description of Primary Screening and Preliminary Alternatives

The alternatives analysis is a two-stage screening process: primary screening and final screening. The primary screening process is established to detect any fundamental flaw (cost, engineering, environmental factor) or failure to meet the primary purpose and need requirements and goals. Groups of alternatives were defined from the families established in the Statement of Purpose and Need:

- **Group 1:** No Additional Action (only existing programmed projects and maintenance would be implemented)
- **Group 2:** Major Off-system Local Improvements (State System No-Build)
- **Group 3:** Minor Improvements Along Existing SR 9
- **Group 4:** Major Improvements Along Existing SR 9
- **Group 5:** Major Off-Route Improvements

Because the primary purpose and need of alternatives was to improve level of service (LOS) and improve safety, the measure of these criteria was determined by analyses of forecast traffic volumes and resultant roadway capacities. A computational model based on the study area's traffic and roadway network was utilized to determine the traffic volumes on SR 9 for new alignments.

A draft document of the Preliminary Alternatives Report related to the groups above was submitted for review. The review and decisions made by groups on conceptual alternatives involved an Interagency Coordination Meeting (December 19, 2002), a Community Advisory Committee (CAC) meeting (September 23, 2002), and a Public Information meeting (September 23, 2002), all held in Greenfield (See Appendix A for meeting minutes.) Based on input from these meetings and as a result of additional network modeling, alternatives within the five groups noted above were developed and modified.

These alternatives were coordinated with the Central Indiana Suburban Transportation and Mobility Study (CISTMS), pronounced "Systems", to ensure that there would be no duplication of projects.

The CISTMS examined suburb-to-suburb mobility in the nine-county Central Indiana region, including SR 9 in Hancock County. The study analyzed the addition of an outer freeway belt on the east side of the Central Indiana region and parallel to SR 9, but concluded that an outer belt would not greatly affect state highway volumes in the study corridors, except that "additional study may be warranted for the portion of the outer belt that would link I-69 with I-70 in the northeast." This North-South Mobility Corridor (Figure 2) would produce an estimated 18% reduction in VMT (Vehicle Miles of Travel) within the SR 9 corridor. The study concluded, however, that this new roadway is not critical for addressing identified problems in the region and that the costs and impacts do not appear to be warranted.

CISTMS further studied improvement strategies specific to SR 9 in Greenfield. The study noted that, since opportunities for adding travel lanes through Greenfield were limited, an SR 9 bypass was tested to evaluate the effect on traffic congestion. Analysis revealed that the volume of diverted traffic did not warrant construction of the bypass, indicating that many trips on SR 9 have an origin and destination in Greenfield. The CISTMS study recommended that improvements to local routes be pursued to better serve these trips and reduce the traffic demand on SR 9.

During the screening process, a new group of alternatives came about as a result of observing truck traffic patterns in the Greenfield area and research on truck traffic control currently being implemented in other Indiana cities.

- **Group 6:** Minor Off-Route Improvements with Truck Traffic Control (State System No-Build)

A large number of alternatives from each of these six main groups were reviewed and evaluated throughout the primary screening process. Figure 3 presents a graphic depiction of the six groups of alternatives evaluated.

Table I lists the Primary Screening Analysis of Alternatives and a summary of the findings as related to purpose and need. The following section and Figures 4-8 describe each of the groups of alternatives considered under the primary screening process.

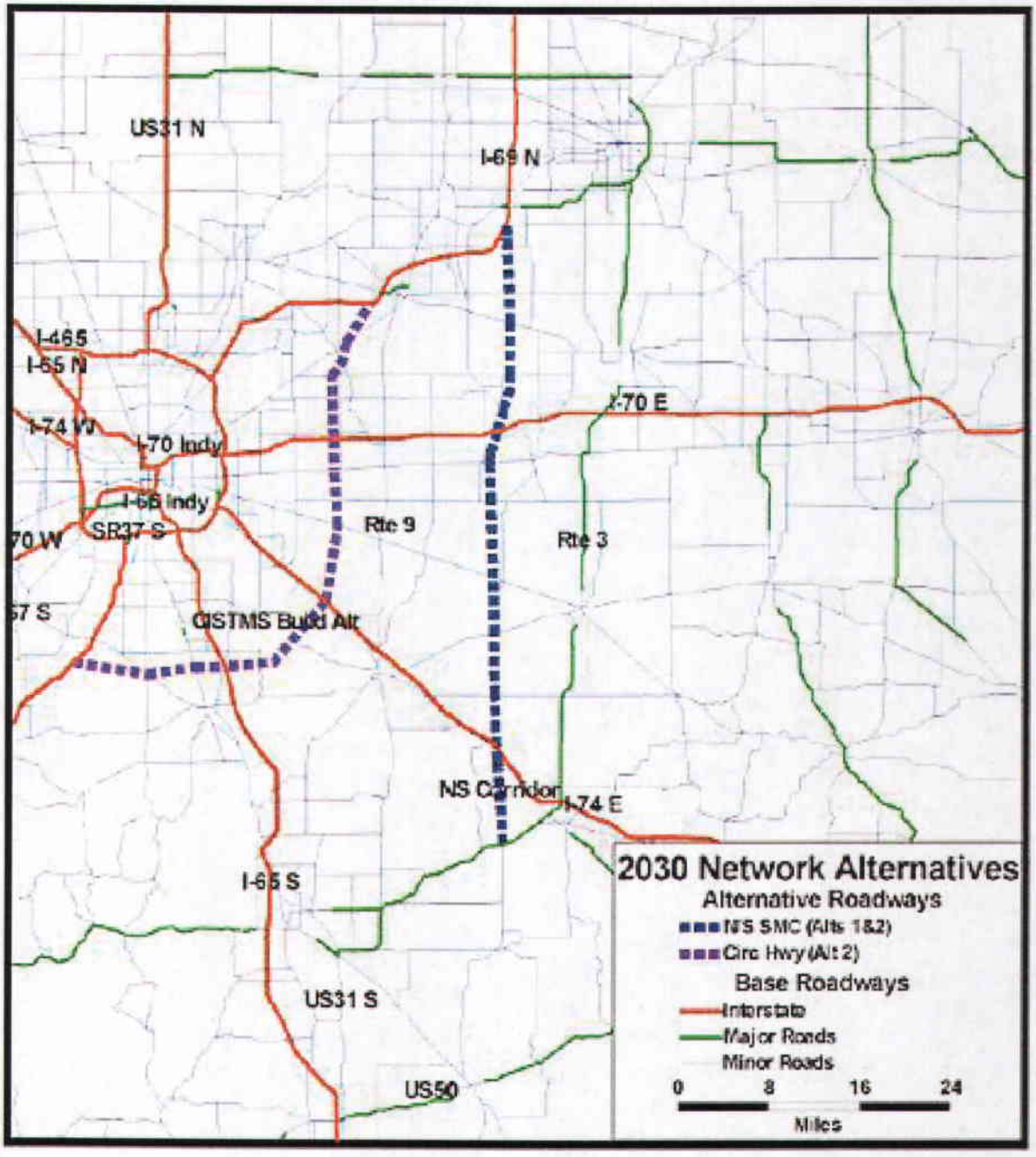

Figure 2 - North-South Mobility Corridor from the CISTMS study.

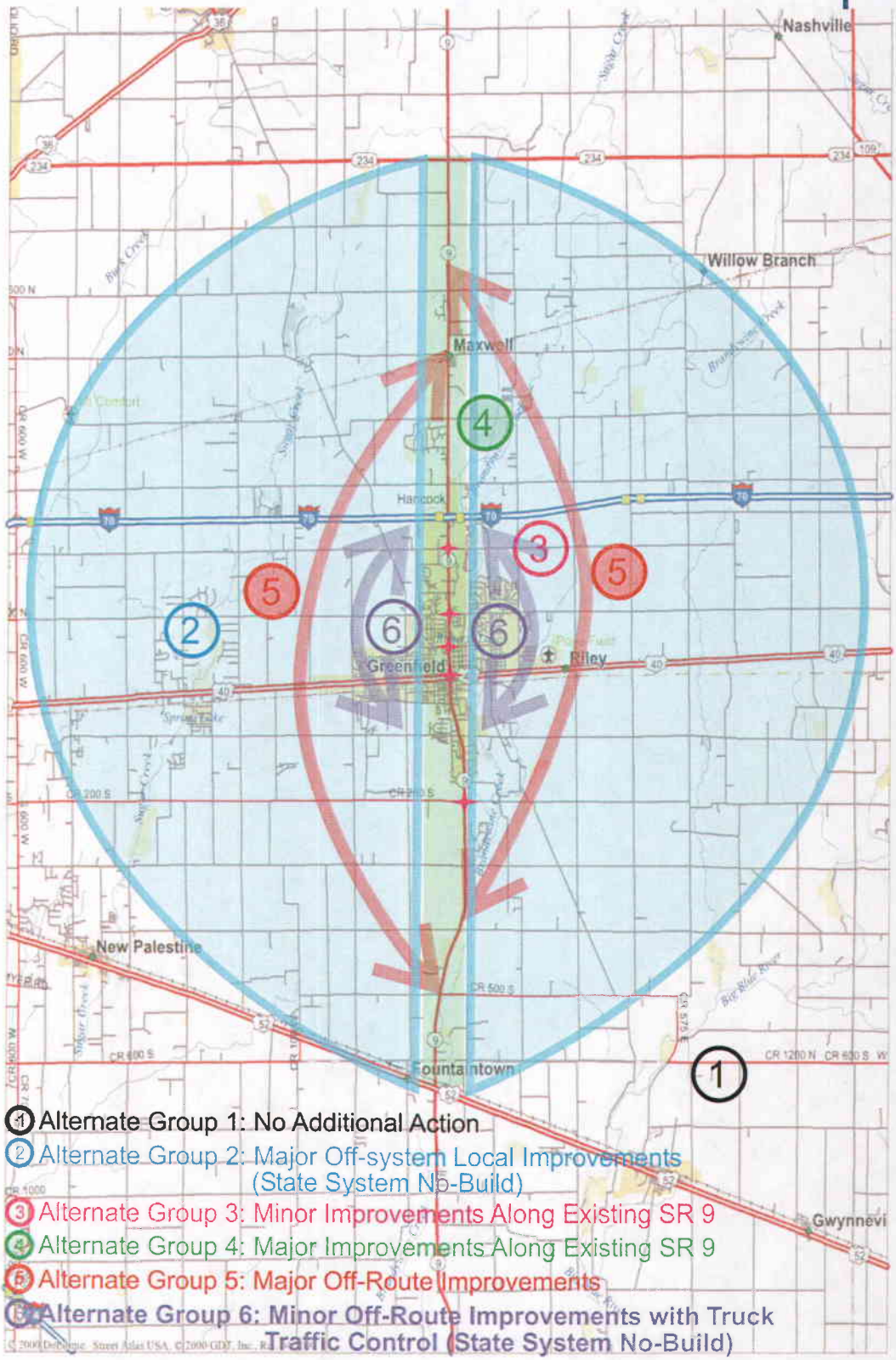

Figure 3 - Alternative Groups

Table I - Primary Screening of Alternatives

Alternative	Description	Length (Miles)	Meets Purpose & Need		Advanced to Secondary Screening
			LOS	Safety	
Alternative Group 1 – No Additional Action					
N-1	No Build	-	N	N	N
Alternative Group 2 – Major Off-System Local Improvements (State System No-Build)					
L-1 (CAC)	Meridian St. Corridor - US 40 to New Road	2	N	N	N
L-2	Franklin Street Corridor - New Road to Davis Road (Add travel lanes)	3	N	N	N
L-3 (CAC)	Blue Road Corridor - US 40 to New Road	1.9	N	N	N
L-4	S. Morristown Pike Corridor (Add travel lanes)	1	N	N	N
L-5 (CAC)	CR 400E Corridor - Davis Road to New Road (Add travel lanes)	3	N	N	N
L-6	Intersection Improvements (New Rd. & Blue Rd./Apple Rd. & Blue Rd.)	-	N	N	N
L-7	Extend Broadway to Davis Rd.(Construct 2-lane collector)	0.8	N	N	N
L-8	New Road - Meridian Street to CR 400E (Add travel lanes)	3.9	N	N	N
L-9	McKenzie Road - Meridian Street to CR 400E (Add travel lanes)	3.9	N	N	N
L-10	Davis Road - Franklin Road to CR 400E (Add travel lanes)	3.9	N	N	N
L-11	One-way pair, north-south, parallel to SR 9, Davis Rd. to McKenzie Rd. (Reconstruct 2-lane collectors)	1.9	Y	Y	Y
L-12	Mass Transit	_	N	N	N
Alternative Group 3 - Minor Improvements Along Existing SR 9 (Improve intersections by adding/extending turn lanes, signal timings, radius improvements)					
I-1	SR 9 at I-70	-	N	Y	N
I-2	SR 9 at New Road	-	N	Y	N
I-3	SR 9 at McClarnon Drive	-	N	Y	N
I-4	SR 9 at McKenzie Road	-	N	Y	N
I-5	SR 9 at US 40	-	N	Y	N
I-6	SR 9 signal timings	-	N	Y	N
I-7	US 40 Traffic Improvements	7.9	N	Y	N
Alternative Group 4 - Major Improvements Along Existing SR 9 (Adding capacity in the form of additional travel lanes)					
A	CR 600N - SR 234	2	N	N	N
B	CR 500N - CR 600N	1	N	N	N
C	CR 300N - CR 500N	2	N	N	N
D	I-70 - CR 300N	0.5	Y	Y	Y
E	CR 200N (New Road) - I-70	0.5	N	N	N
F	CR 100N (McKenzie Road) - CR 200N (New Road)	1	N	N	N
G	US 40 - CR 100N (McKenzie Road)	1	Y	Y	Y
H	Osage St. - US 40	0.2	Y	Y	Y
I	CR 100S (Davis Road) - Osage St.	0.7	Y	Y	Y
J	CR 300S - CR 100S (Davis Road)	2	N	N	N
K	US 52 - CR 300S	3.6	N	N	N
Alternative Group 5 - Major Off-Route Improvements (Four-lane, divided, limited-access freeway)					
E1A	Bypass 2.1 miles to the east of Greenfield, full length	10	Y	Y	N
E1B	Bypass 2.1 miles to the east of Greenfield, full length	13.5	Y	Y	N
E1C	Bypass 2.1 miles to the east of Greenfield, full length	13.5	Y	Y	N
E1	Bypass 2.1 miles to the east of Greenfield, from I-70 south to SR 9	6.0	Y	Y	Y
E2	Bypass 4.4 miles to the east of Greenfield, full length	14.9	N	N	N
E3 (CAC)	Bypass 4.4 miles to the east of Greenfield, full length	21.7	N	N	N
W1	Bypass 3.4 miles to the west of Greenfield, full length	14.2	N	N	N
W2 (CAC)	Bypass 3.8 miles to the west of Greenfield, full length	17	N	N	N
W2A	Bypass 3.8 miles to the west of Greenfield, full length	14.1	N	N	N
Alternative Group 6 - Minor Off-Route Improvements with Truck Traffic Control (State System No-Build)					
L1-T	Meridian St. Corridor - New Road to US 40, with S.Franklin Rd. and Davis Rd. to SR 9, 1 mile south.	5.7	Y	Y	Y
L2-T	Franklin Street Corridor - New Road to Davis Road (Add travel lanes)	5	Y	Y	Y
L5-T	CR 400E Corridor - Davis Road to New Road (Add travel lanes)	7.4	Y	Y	Y
L3-T and L4-T	Blue Road Corridor - US 40 to New Road and S.Morristown Pike Corridor	4.8	Y	Y	Y

Group 1 – No Additional Action
(Only existing programmed projects and maintenance to be implemented)
The No-Action Alternative assumes that only programmed projects in the current MPO Year 2030 Regional Transportation Plan would be implemented and that no additional action be recommended. The No-Action Alternative does not satisfy the stated purpose and need. However, this alternative would be carried forward to serve as a benchmark in a subsequent NEPA study in comparing effectiveness and potential impacts of recommended alternatives.

Current projects under the MPO Year 2030 Regional Transportation Plan are identified in Appendix B.

Group 2 – Major Off-System Local Improvements (State System No-Build)
These alternatives mostly consist of upgrading local streets in order to attract traffic from SR 9. In order to serve inter-city cross traffic needs, these alternatives should have strong connections to SR 9 in the downtown area. These alternatives include (See Figure 4):

- **L-1**: Meridian St. Corridor - New Road to Davis Road (Add travel lanes)
- **L-2**: Franklin St. Corridor - New Road to Davis Road (Add travel lanes)
- **L-3**: Blue Road Corridor - US 40 to New Road (Add travel lanes)
- **L-4**: Morristown Pike Corridor (Add travel lanes)
- **L-5**: CR 400E Corridor - Davis Road to New Road (Add travel lanes)
- **L-6**: Intersection Improvements (New Rd. & Blue Rd./Apple Rd. & Blue Rd.)
- **L-7**: Extend Broadway to Davis Rd. (Construct 2-lane collector)
- **L-8**: New Road - Meridian Street to CR 400E (Add travel lanes)
- **L-9**: McKenzie Road - Meridian Street to CR 400E (Add travel lanes)
- **L-10**: Davis Road - Franklin Road to CR 400E (Add travel lanes)
- **L-11**: One-way pair, north-south, parallel to SR 9, Davis Rd. to McKenzie Rd. (Reconstruct 2-lane collectors)
- **L-12**: Mass Transit

Network modeling has shown that most of these corridors, L-1 through L-10, do not draw enough traffic off of SR 9 to improve the level of service to at least a D. Corridors L-2, the Franklin Street Corridor, and L-5, the CR 400E Corridor, provided the most diversion of the Group 2 corridors, but traffic volume reduction was only in the 1% to 5% range and not enough to raise the Level of Service to at least a D.

Some of the corridors had additional concerns. The Meridian Street Corridor, Alternative L-1, would be difficult to implement completely because the southern portion would pass through the Eli Lilly industrial park and the road is being abandoned to private ownership. L-2, the Franklin Street Corridor, had high

potential impacts due to residential areas. L-3, the Blue Road Corridor, also had high potential impacts due to residential areas and a public school adjoining the right of way. Two alternatives, L-3 and L-7, were short segments that would extend or increase the local traffic grid, thus enhancing local mobility, but would not alleviate traffic on SR 9. They may work as components to alternatives with larger range and scope. L-5, the CR 400E Corridor, may have an impact on a historic resource but, because of its location in a lightly developed area, it would incur little disruption. L-6, Intersection Improvements, and L-8, the New Road Improvements, do not increase the level of service and safety on SR 9.

Alternatives L-7, L-9 and L-11 were not in the original list of conceptual alternatives. They were developed by the screening committees in the interest of improving connectivity in the city's street grid system. L-11 was proposed as one solution to adding capacity to SR 9 by developing a north-south one-way pair of roadways. Although the committee acknowledged that there were no good routes for a new roadway parallel and close to SR 9, this alternative would satisfy primary purpose and need by increasing level of service and safety on SR 9 and thus should be continued for future study.

L-12, the mass transit alternative, would be difficult to implement. There currently is no transit service in Greenfield and there are no plans in place to establish one. In the study area such as Greenfield where trips are dispersed, transit service is not a viable option. Trips must be concentrated at both their origin and destination, with a number of riders making relatively similar trips. Dispersed ridership results in insufficient revenue to cover a reasonable portion of operating costs.

On their own, the majority of the alternatives in this group would not alleviate enough traffic on SR 9 to increase the level of service to at least a D. Although they help to improve mobility within the study area, their inability to meet the purpose and need prohibit them for further continuation in this study. Only alternative L-11 met the primary purpose and need by increasing the level of service and safety on SR9, and therefore was advanced to final screening.

Group 3 – Minor Improvements Along Existing SR 9 (On-Route Improvements)

This group consists of short-term improvements that could be implemented relatively quickly and at low cost. Measures such as adding or extending turn lanes, upgrading signal systems, and improving turning radii would improve safety along SR-9. The committees noted that high crash rates on SR 9 warranted urgency. The following alternatives were considered under this group (See Figure 5):

- **I-1**: SR 9 at I-70
- **I-2**: SR 9 at New Road
- **I-3**: SR 9 at McClarnon Drive
- **I-4**: SR 9 at McKenzie Road
- **I-5**: SR 9 at US 40
- **I-6**: SR 9 signal timings
- **I-7**: US 40 Traffic Improvements

Two alternatives, I-1 and I-3, were rejected because they were not at critical locations for safety improvements. The remaining alternatives, I-2 and I-4 through I-7, addressed sites with safety concerns. Alternative I-5, which proposed improvements at the intersection of SR 9 and US 40, was deemed high priority despite high right of way costs. This intersection currently has inadequate turning radii for trucks, resulting in severe traffic congestion, and is in immediate need of improvement.

Although these minor on-route improvements alternatives would increase the level of safety along SR 9, they will not significantly improve the level of service of SR 9. Based on capacity analysis, improvements of intersections alone will not improve significantly the level of service of SR 9 for future traffic volumes. Due to the inability to meet the primary purpose and need of improving both the safety and the level of service of SR 9, this group of alternatives does not advance to final screening.

Group 4 – Major Improvements Along Existing SR 9 (On-Route Improvements)

This group of alternatives consists of increasing capacity to sections of SR 9 by adding travel lanes to SR 9 itself. In the built-up areas of SR 9, however, this often means considerable right of way acquisition and the relocation of homes and businesses. The following alternatives were considered under this group (See Figure 6):

- **A**: CR 600N - SR 234
- **B**: CR 500N - CR 600N
- **C**: CR 300N - CR 500N
- **D**: I-70 - CR 300N
- **E**: CR 200N (New Road) - I-70
- **F**: CR 100N (McKenzie Road) - CR 200N (New Road)
- **G**: US 40 - CR 100N (McKenzie Road)
- **H**: Osage St. - US 40
- **I**: CR 100S (Davis Road) - Osage St.
- **J**: CR 300S - CR 100S (Davis Road)
- **K**: US 52 - CR 300S

Most of the alternatives (A, B, C, E, F, J, and K) were rejected because they did not address the primary purpose and need of providing capacity and safety where needed. However, alternatives D,G, H, and I add lanes at locations where the LOS is anticipated to be an E or F in year 2025. Alternative D was identified as high priority because of rapid growth occurring along this segment.

The four alternatives in the sections of unacceptable levels of service were grouped together as one in order to meet purpose and need for the entire length of SR 9 in the study area. This new alternative, DGHI, was advanced to the final screening.

Group 5 – Major Off-Route Improvements

Major, off-route improvements, or bypasses, are often the first alternative proposed for traffic congestion relief in smaller cities. The intent of a bypass of SR 9 is to alleviate semi-tractor/trailer (truck) and through vehicles from downtown Greenfield. As a means of addressing this issue, nine (9) bypass alternatives located to the west and east of Greenfield were analyzed. The following bypass alternatives were considered (See Figure 7):

- **E1**: Bypass 2.1 miles east of Greenfield, approximate length 6.0 miles
- **E1A**: Bypass 2.1 miles east of Greenfield, approximate length 10.0 miles
- **E1B**: Bypass 2.1 miles east of Greenfield, approximate length 13.5 miles
- **E1C**: Bypass 2.1 miles east of Greenfield, approximate length 13.5 miles
- **E2**: Bypass 4.4 miles east of Greenfield, approximate length 14.9 miles
- **E3**: Bypass 4.4 miles east of Greenfield, approximate length 21.7 miles
- **W1**: Bypass 3.4 miles west of Greenfield, approximate length 14.2 miles
- **W2**: Bypass 3.8 miles west of Greenfield, approximate length 17.0 miles
- **W2A**: Bypass 3.8 miles west of Greenfield, approximate length 14.1 miles

Three western (W1, W2, W2A) and six eastern (E1A, E1B, E1C, E1, E2, E3) bypass alternatives were evaluated for level of service using the calibrated traffic model of the study area. The bypass alternatives E1, E1A, E1B, E1C, E2, W1 and W2A were analyzed as four-lane, divided, limited-access freeways that tie in to the north and south of Greenfield and provide a connection to I-70 with a new interchange. Alternatives E3 and W2 are alternatives utilizing existing roadways as a means of providing a bypass of the SR 9 corridor.

Analysis of these bypass alternatives indicated that very little passenger and heavy vehicle traffic would be diverted from SR 9 and that this traffic would continue to use the downtown route. An origin-destination study of the travel market within the study area revealed that only approximately 20% of vehicles are making through movements, or traveling along SR 9 through the entire project area. This indicates that about 80% of the vehicles using SR 9 have either started their trip or are ending their trip within the study limits. In theory, a bypass would generally not serve their needs.

Of all the bypass alternatives considered, only one of the bypass alternatives, E1, diverted traffic off of SR 9 significantly enough to improve the level of service along SR 9 to at least a D. This alternative, therefore, was advanced to final screening.

Group 6 - Minor Off-Route Improvements with Truck Traffic Control (State System No-Build)

A new group of alternatives was generated after observing that bypass and perimeter routes were diverting very little traffic off of SR 9 and that truck traffic contributed significantly to downtown congestion. Field observation of truck movements revealed a large variety of truck types, sizes, and weights, indicating a variety of origins and destinations. Trucks passing through the downtown area ranged from full-size semi truck-tractor trailers to commercial pickup trucks. Truck logos and company names indicated commercial long-range haulers, grain trucks, retail suppliers, food services, utility services, mail and parcel shippers, industrial suppliers, home deliveries, building products, and manufactured homes.

As noted previously, an origin-destination study of the travel market within the study area revealed that, on a daily basis, only approximately 20% of the total heavy vehicle (truck) traffic entering the study area can be classified as "through" traffic, traffic which does not have an ultimate origin or destination in the Greenfield area (i.e. passing through the study area). Approximately 30 % of this "through" truck traffic (6% of the total truck traffic) can be classified as through trips in which the vehicle both entered and exited the system on SR 9 outside the study limits. This data reveals that much of the travel market along SR 9 consists of local, intra-city movements (See Figure 9.) An analysis of passenger vehicle volumes displayed similar travel pattern results.

At the intersection of SR 9 and US 40 both turning and through truck traffic movements were observed. Occasionally, large trucks turning right from southbound SR 9 to westbound US 40 would encroach into the opposite lanes after waiting for traffic to clear. These incidents have been one source of traffic congestion on SR 9. On the north end of Greenfield, between McKenzie Road and I-70, are a number of large distribution and manufacturing plants. From this area, truck semi-trailer traffic heads to and from I-70 and US 40 by way of State Street (SR 9), New Road, Broadway Street, Franklin Street (Fortville Pike), Apple Street (Morristown Pike), and Blue Road. Another generator of truck traffic through Greenfield is the Central Soya processing plant on US 52 at nearby Morristown. In short, Greenfield generates and attracts truck traffic and the intersection of SR 9 and US 40 serves as the hub to outlying arterials and collectors.

Through cooperation with Hancock County and local Greenfield industries, a total of seventy-four (74) companies were contacted via telephone or mail regarding truck traffic usage on or near SR 9 in the Greenfield area. Approximately 30% of the companies contacted responded to the survey. Survey responses, however,

did not provide substantial data to indicate a distinct alternate route for truck traffic. Of the survey responses requesting or recommending changes in the current route and existing street layout, there were several requests for a bypass to the west of SR 9 or local improvements and widening of Meridian Street from New Road to CR 100S, including upgrades to New Road.

As noted in the analysis of the Group 2 (Major Off-System Local Improvements) and the Group 5 (Major Off-Route Improvements), the network modeling indicates that, with the exception of the bypass E1 and the one-way pair L-11, provision for alternate routes does not by itself divert significant traffic from SR 9. Although provision of a more efficient and economical route with the city perimeter may encourage truck traffic to use an alternate route, this route is difficult to identify due to the historical and residential areas within close proximity to SR 9. The majority of feasible alternate routes with respect to preservation of historical sites and minimal impact to residential areas would increase the necessary travel time of the truck traffic through Greenfield. Therefore, a more efficient and economical route avoiding historical and residential impacts is not available.

One possible solution may be to reroute the truck traffic from a portion of SR 9. Rerouting truck traffic on the downtown portion of SR 9 would provide two benefits: a reduction of 7% of the total volume of traffic on State Street (in addition to the reduction in traffic that the new routes were to produce anyway), thus improving the Level of Service from E to D, and reducing objectionable noise, disruption, and pollution in the downtown area. Rerouting truck traffic to a designated non-State route would require that, by Indiana Code, the City be responsible for the development and maintenance of the truck route.

The cities of Pendleton, Rushville, and Connersville, IN have implemented the use of designated truck routes within the city limits. Implementation of truck routing from downtown Pendleton was achieved by using a network of existing state routes. Utilizing these existing state routes eliminated the need to reroute trucks onto local and /or county roads. The Town of Rushville designated truck routes along city streets and has sought INDOT cooperation to provide additional route changes. In Connersville, truck traffic was rerouted to city streets because the state route through town contained a low clearance bridge. Although local conditions provided a relatively easy means of implementing the designated truck routes, these cities are realizing the benefits of increased mobility and reduced congestion and pollution.

A new group, Minor Off-Route Improvements with Truck Traffic Control (Group 6), was created for evaluation. This group consists of those alternatives that would provide alternate routes to SR 9 for truck travel. Four alternatives were considered under this group, including (See Figure 8):

- **L1-T**: Meridian St. Corridor - New Road to US 40, with S. Franklin Rd. and Davis Rd. to SR 9, 1 mile south.
- **L2-T**: Franklin Street Corridor - New Road to Davis Road (Add travel lanes)
- **L5-T**: CR 400E Corridor - Davis Road to New Road (Add travel lanes)
- **L3-T/L4-T**: Blue Road Corridor - US 40 to New Road and S. Morristown Pike Corridor

For each alternative, heavy truck traffic would be rerouted from a section of State Street, 1 mile north and south of US 40, from McKenzie Road to Davis Road (CR 100S), where capacity is limited and the Level of Service (LOS) at year 2025 will be at 'F'.

Capacity analysis of each of these alternatives indicates that this rerouting of trucks and resulting reduction of traffic volume, in addition to the reduction in traffic due to the routes themselves, would result in a year 2025 LOS of at least a 'D' on State Street, the minimum acceptable level.

The resultant reduction in congestion downtown and the separation of truck traffic would reduce the number of potential conflicts and crashes for all of the Group 6 alternatives thus improving safety. All the Group 6 alternatives meet the purpose and need in improving the level of service and improving safety along the existing SR 9 corridor. In addition, there will be an improvement in the local transportation system's ability to handle internal travel, primarily north-south movements across the area.

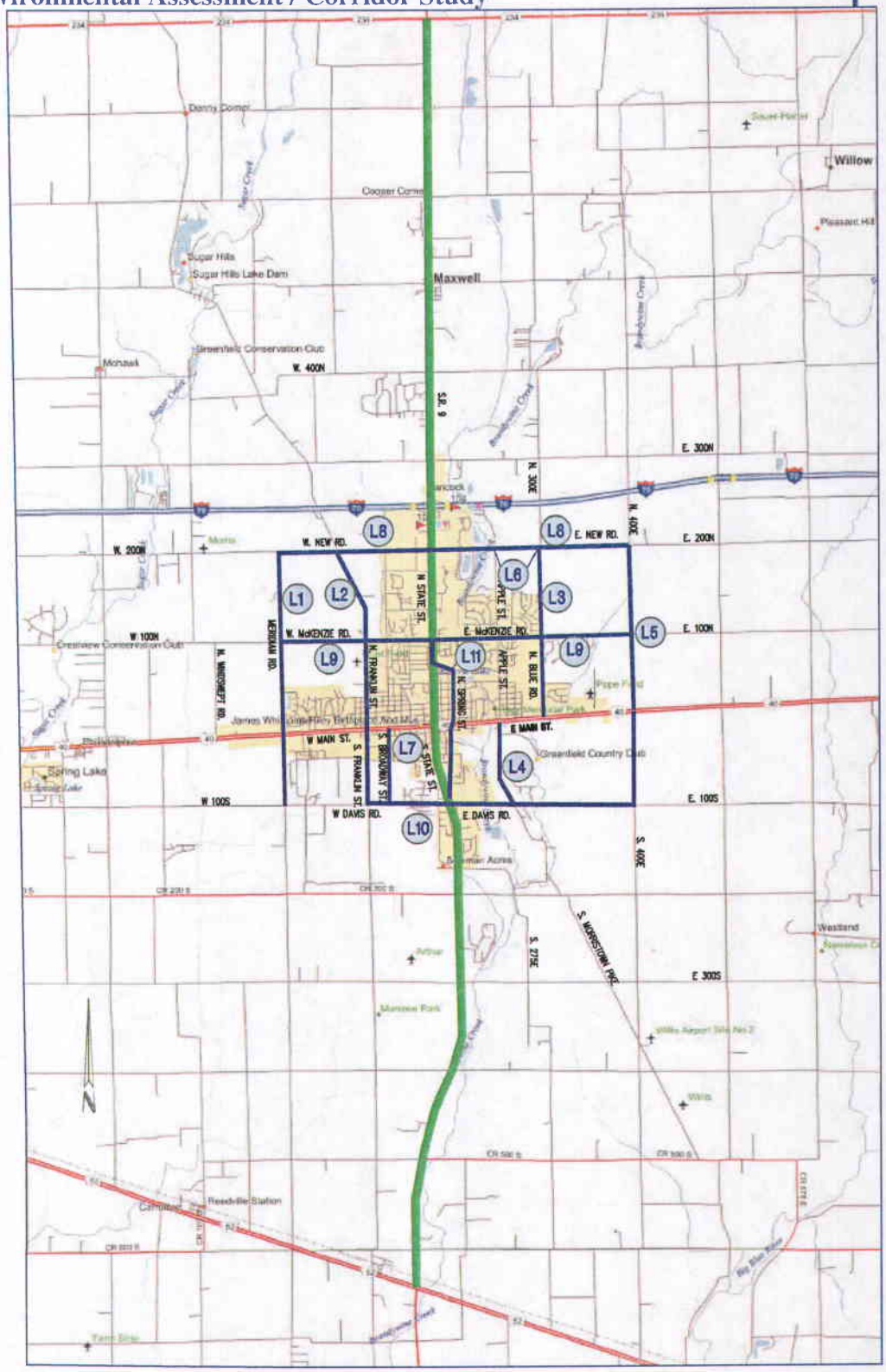

Figure 4 - Group 2 Alternatives: Major Off-System Local Improvements (State System No-Build)

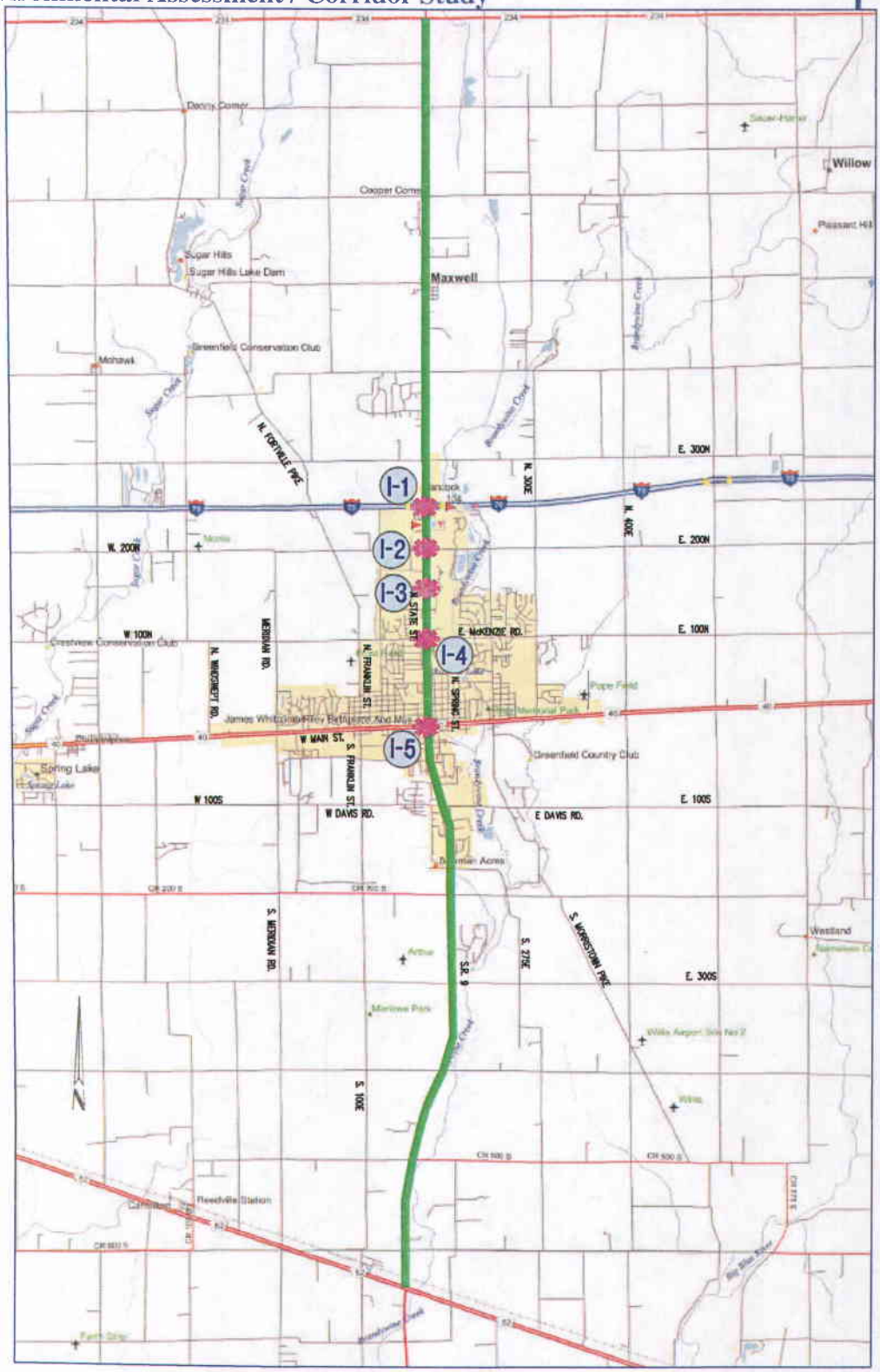

Figure 5 - Group 3 Alternatives: Minor Improvements Along Existing SR 9

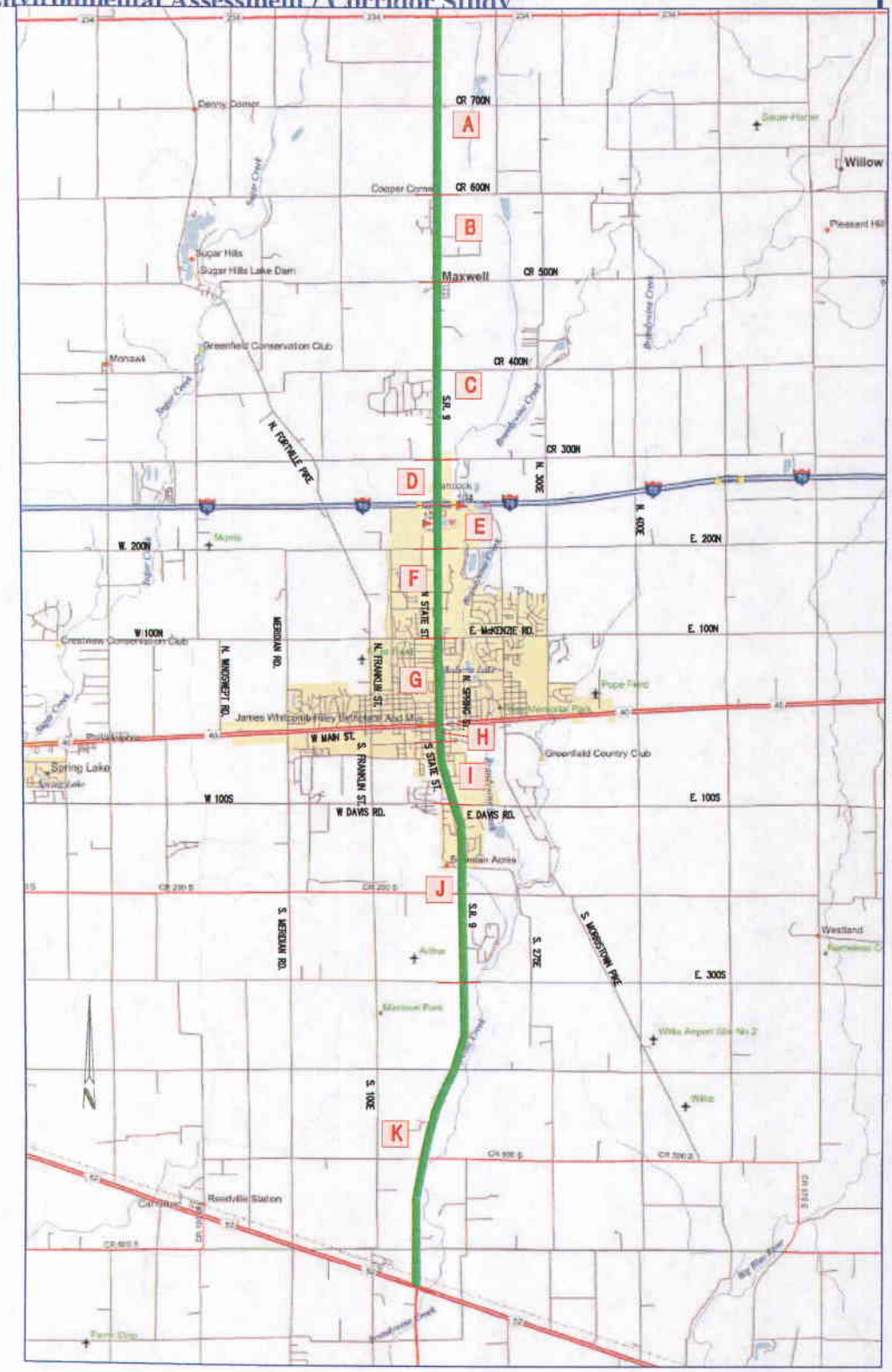

Figure 6 - Group 4 Alternatives: Major Improvements Along Existing SR 9

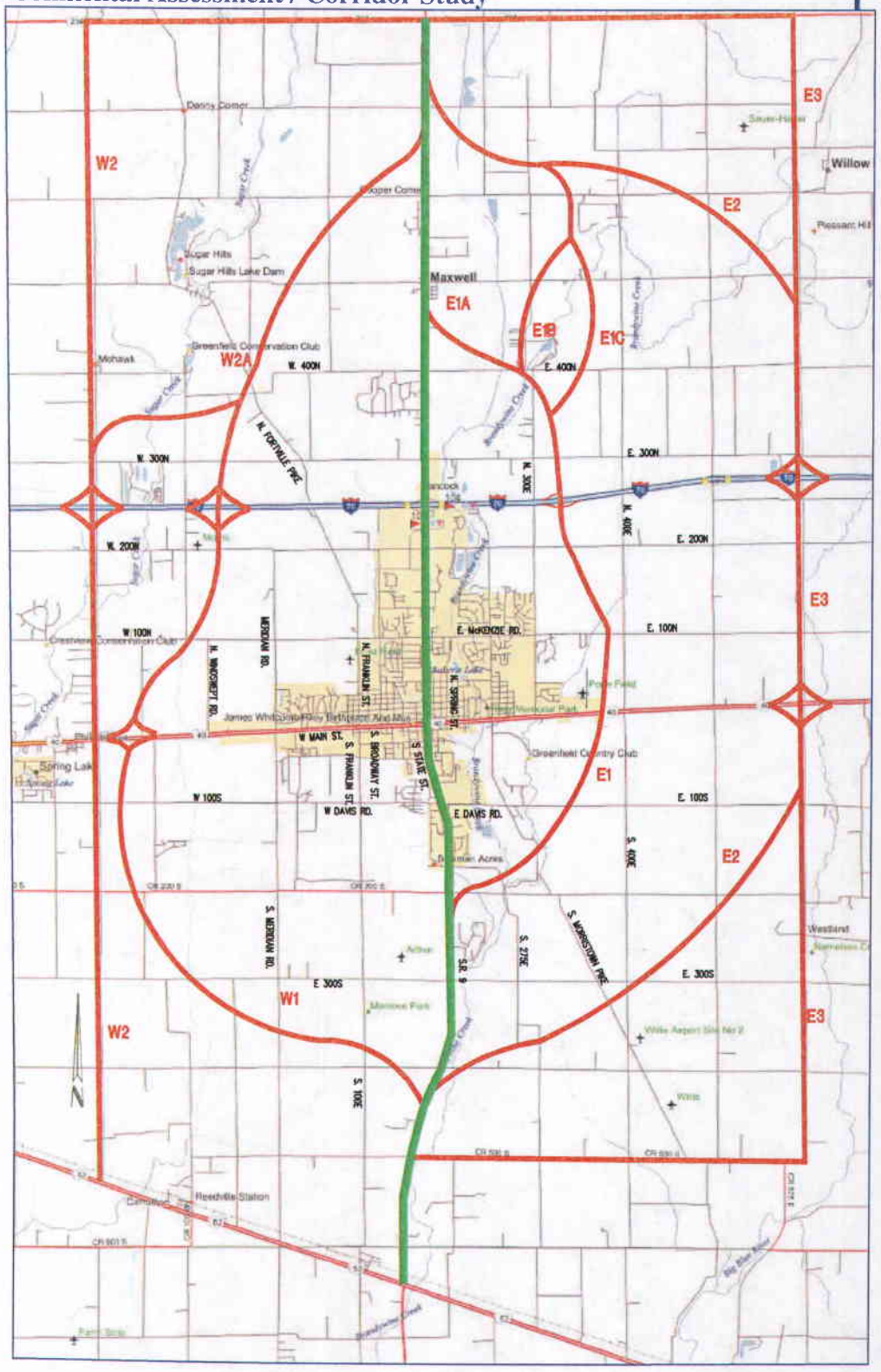

Figure 7 - Group 5 Alternatives: Major Off-Route Improvements

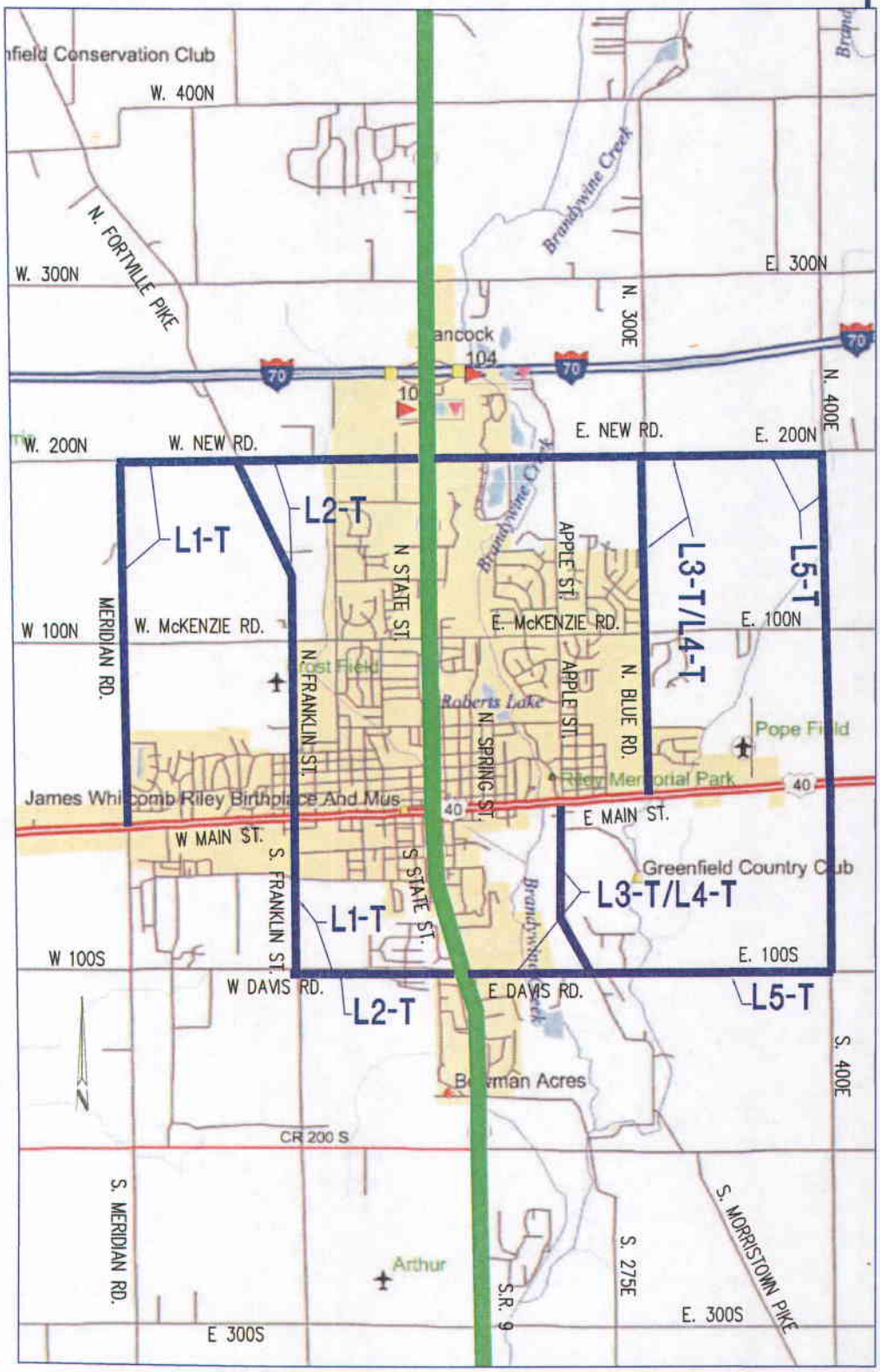

Figure 8 - Group 6 Alternatives: Minor Off-Route Improvements with Truck Traffic Control (State System No-Build)

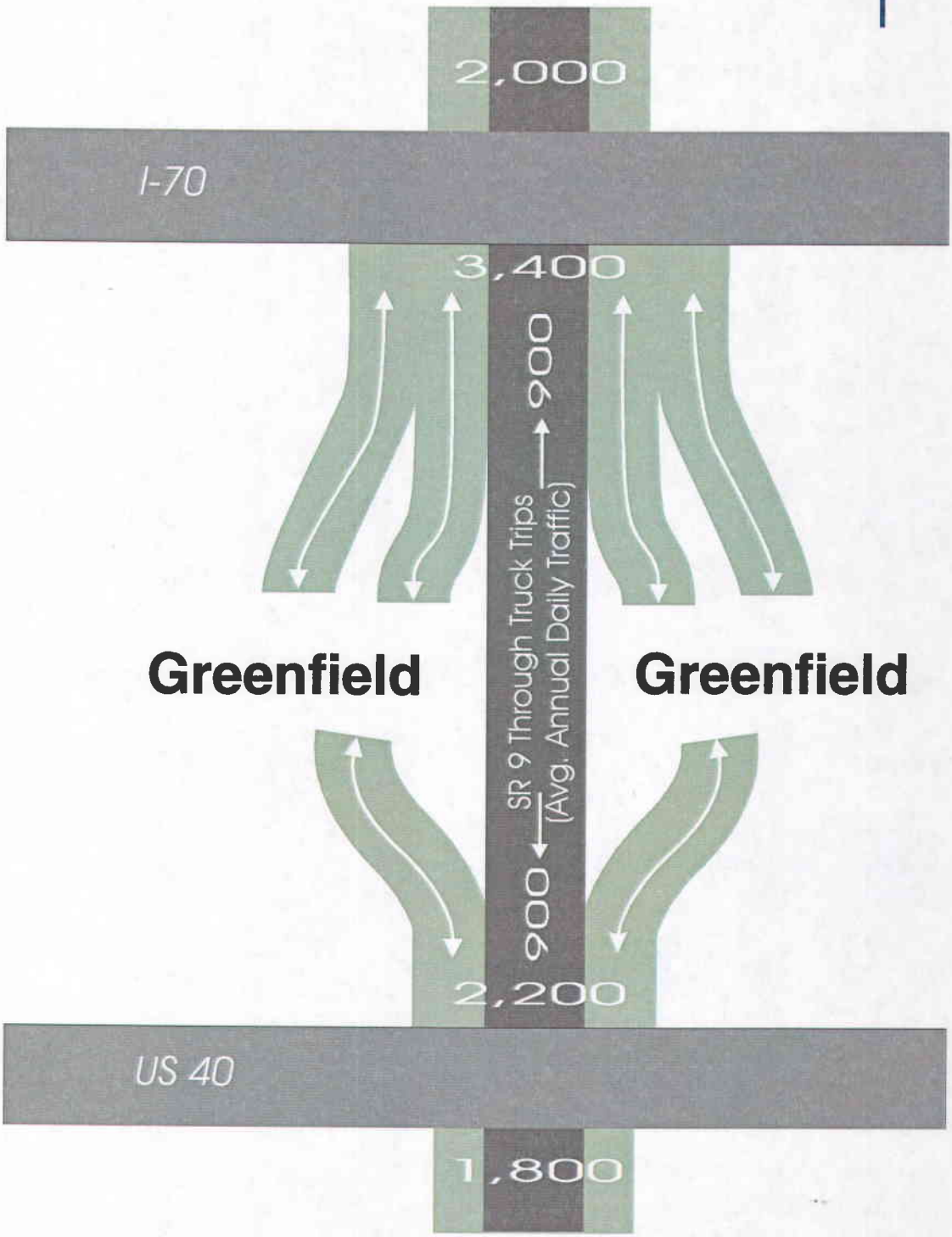

Figure 9 - Schematic Representation of Through Truck Trips Along SR 9

(1999 Average Annual Daily Truck Traffic AADT)

Final Screening

The second stage of the analysis is the final screening of alternatives. This stage of the process involves detailed engineering and an environmental overview of the retained and modified alternatives brought forward from the primary stage. A selected build alternative, if one is recommended, will serve as placeholder for INDOT programming. The results from the alternatives analysis screening will be incorporated into this study's Final EA/Corridor Study Report. The final report, based on background work, public participation input, and recommendations, will identify a preferred alternative and be submitted to the FHWA for approval.

With the exception of the No-Action alternative, the alternatives remaining at this stage meet the criteria set forth in the Purpose and Need and are increasingly comparable. These alternatives required a more detailed study and evaluation through engineering and environmental overview. Environmental impacts were evaluated over a broader range of variables than used in the primary screening. Adding to the categories of relocations and historical resources were significant factors such as wetlands, hazardous wastes, prime farmland, and floodplains. Some criteria became more significant in the discussions by the CAC and the IAC in developing and screening alternatives. Criteria such as the ability to decrease truck traffic, providing an I-70 detour, or having a short project implementation time were used frequently. As a result, these factors were added to the final screening process.

The Purpose and Need identified four segments along SR 9 that are anticipated to have an unacceptable level of service in the year 2025. Three of the sections are located in the area extending from CR 100S (Davis Road) north to McKenzie Road. The fourth section extends from I-70 north to CR 300N; the area just north of the I-70 interchange. The I-70 Interchange Modification at SR9 was identified in the Indiana Interstate Interchange Study as an area identified for expansion and major improvements. It is anticipated that this work effort will provide improvements that will increase both the safety and LOS in the segment just north of I-70. Therefore, the alternatives considered in the final screening do not address this area.

The alternatives were compared in order to identify potential recommendations. Figure 10 provides a location map of the final alternatives. A total of 7 alternatives were examined for final screening:

- **L-11:** Creating a one-way pair of north-south roadways and providing major on-route improvements north and south of the one-way pair.
- **GHI:** Providing additional travel lanes to three segments of SR 9 to attain capacity.

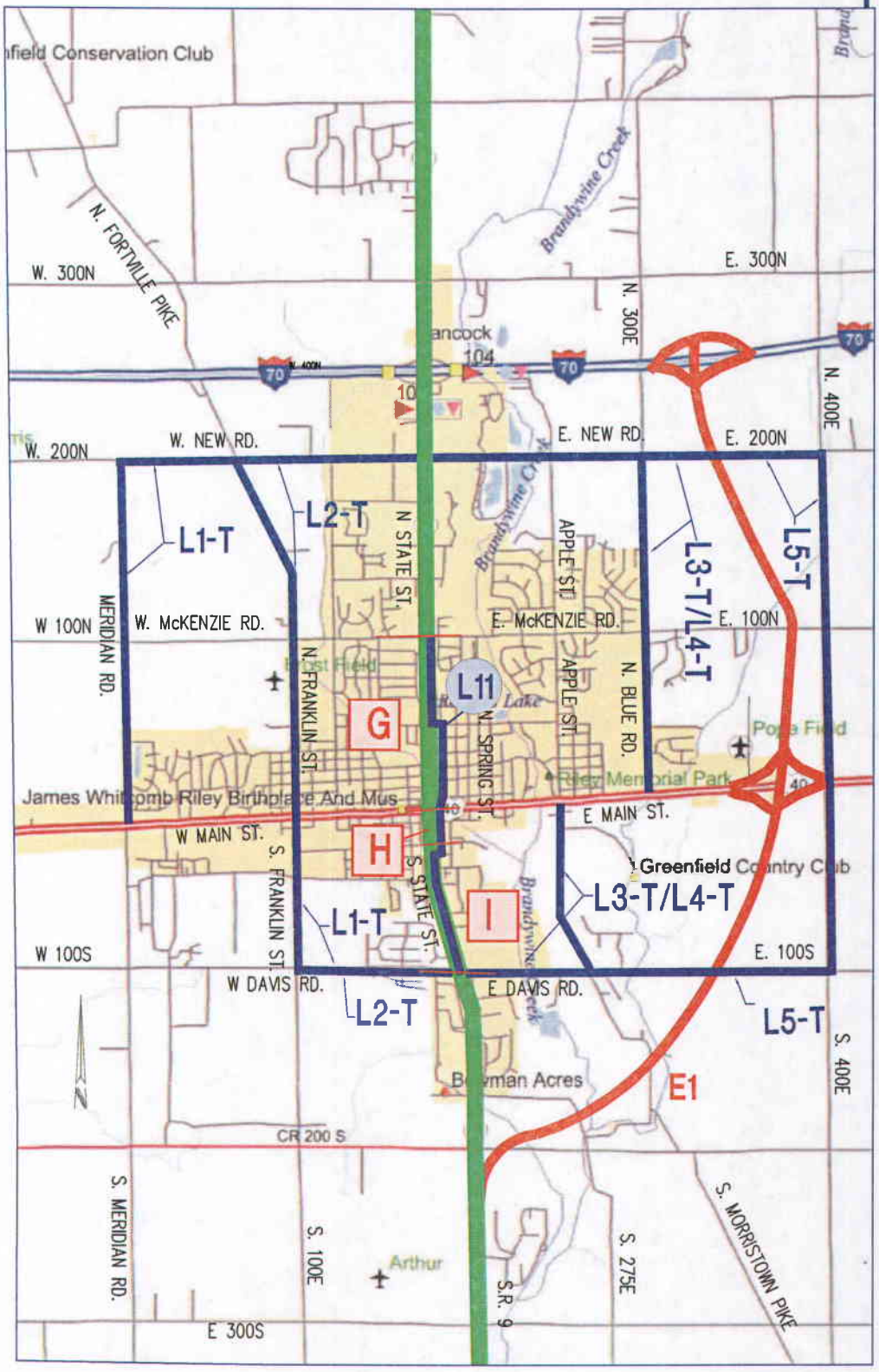

Figure 10 - Final Screening Alternatives

- **E1:** Providing a 6.0-mile bypass east of Greenfield, from SR 9 near CR200S to I-70.
- **L1-T:** Providing corridor improvements to Meridian Street Corridor from New Rd. to US 40 and S. Franklin Rd. from US 40 to Davis Rd. and truck traffic control. Improvements will also be made to New Rd. and Davis Rd. connecting the Corridor to SR9.
- **L2-T:** Providing corridor improvements to Franklin Street Corridor from New Road to Davis Road and truck traffic control. Improvements will also be made to New Rd. and Davis Rd. connecting the Corridor to SR9.
- **L3-T/L4-T**: Providing corridor improvements to CR400E Corridor from Davis Road to New Road and truck traffic control. Improvements will also be made to New Rd. and Davis Rd. connecting the Corridor to SR9.
- **L5-T**: Providing corridor improvements to Blue Road Corridor from US 40 to New Road and S. Morristown Pike Corridor and truck traffic control. Improvements will also be made to New Rd. and Davis Rd. connecting the Corridor to SR9.

Discussion of Evaluations

No-Action
(Only existing programmed projects and maintenance implemented)

As discussed previously in the primary screening, this alternative should be retained to serve as a benchmark when comparing effectiveness and potential impacts of other alternatives.

Alternative L-11 With Major On-Route Improvements (State System No-Build)

This major, on-system, local improvement designates an existing road to be paired with SR 9 to provide a parallel one-way north-south corridor. The difficulty in this alternative lies with determining which street parallel to SR 9 could function effectively as one leg of a one-way north-south pair. The longest existing street parallel to SR 9 is North East Street from US 40 to East Boyd Avenue, has adequate right of way width and could serve as northbound lanes but it is located in a residential zone. The north and south end of this segment would require short connector roads, cutting through residential and historic areas, to join SR 9. This section of roadway does not address all of the areas anticipated to have an unacceptable level of service in 2025. The remainder of SR9 in the area north of East Boyd Avenue to McKenzie Road and the area south of US 40 to Davis Road (CR 100S) must be widened with additional lanes to provide capacity as a four-lane undivided urban arterial.

Construction of this alternative will result in approximately 65 relocations, the disturbance of 2 historical and 10 hazardous materials sites, and the disturbance of approximately 6 acres of floodplains. There is no anticipated disturbance of wetlands or prime farmlands with this alternative. The approximate construction cost (2005) for this project is $7,300,000.

Alternative GHI

This alternative consists of major on-route improvements along existing SR 9 in the areas where the level of service would have been and "E" or an "F" in the forecast year of 2025 (excluding the area north of I-70 as previously discussed.) SR 9 will be widened with additional lanes to provide capacity as a four-lane undivided urban arterial. Areas to be widened include: Section G (US 40 to CR 100N/E. McKenzie Road), Section H (Osage Street to US 40), and Section I (Davis Road to Osage Street). CR100N/E. McKenzie Road north to I-70 is currently a five-lane section, consisting of two travel lanes in each direction with a two way left turn lane with an anticipated level of service of a "B" and "C".

These segments, however, have a narrow right of way in a highly-developed commercial and residential area and adding lanes will require a large number of relocations at a high right of way and disruption costs. Construction of this alternative results in extensive relocations, the disturbance of 7 historical and 18 hazardous materials sites, and the disturbance of approximately 6 acres of floodplains. There is no anticipated disturbance of wetlands or prime farmlands with this alternative. The approximate construction cost (2005) is $7,100,000 total for the three segments.

Alternative E1 (Bypass)

This alternative consists of major off-route improvements by providing a bypass. Alternative E1 is a bypass located approximately 2.1 miles to the east of SR 9 from CR 200S on SR 9 to a new I-70 interchange. Analysis using the traffic model indicates that the E1 bypass technically would improve the overall level of service on SR 9 from an E to a D. This improvement is slight and will result in only a small increase in travel speeds on SR 9 from 15.8 to 17.4 miles per hour. Of all alternatives considered under final screening, this alternative reduces traffic an SR 9 the least and has one of the highest construction costs.

During primary screening, it was evident that the bypass alternatives were significantly more costly to implement than the other alternatives examined. As a means of reducing construction costs, the bypass route would initially consist of two travel lanes with limited access and with a four-lane right of way width to allow for future expansion to a four-lane highway. The two-lane bypass would be capable of carrying the volume of traffic initially anticipated. In comparison to alternatives L-11 with major on-route improvements and GHI, there are potentially significantly higher impacts to prime farmland, wetland, floodplains, and stream crossings. Construction of this alternative will result in approximately

15 relocations with no disturbances to historic or hazardous materials sites. However, bypass construction will result in impacts to approximately 0.41 acres of wetlands, 21 acres of floodplains, and 203 acres of prime farmland in addition to 7 stream crossings. The construction cost (2005) for this alternative is approximately $34,200,000.

Another factor in the evaluation of the bypass alternative is the feasibility of adding an interchange on I-70. According to INDOT's Interstate System criteria and AASHTO Guidelines, interchanges must be spaced at least one mile apart in urban areas and three miles apart in rural areas. The Urbanized Area Boundary (UAB) of Greenfield extends only one mile east of the existing interchange at SR 9. A new interchange within the UAB would not meet the minimum one-mile spacing criteria. Locating a bypass interchange east of the UAB places it less than 3 miles from the existing SR 9 interchange and less than 3 miles from the rest area and therefore does not meet rural spacing criteria. Alternative E1, therefore, is not a viable alternative.

Minor Off-Route Improvements with Traffic Control (State System No-Build)

There are four independent alternatives in this group. These alternatives are functional only with the provision that truck traffic downtown be rerouted from congested areas of State Street (SR 9). Because Indiana Code prohibits INDOT from restricting truck traffic on state routes, development and maintenance of the truck routes would be the responsibility of the City of Greenfield and require coordination with INDOT. To avoid the costs and negative perception of enforcement, the new truck routes should attract truck traffic by offering time savings and increased maneuverability.

The following alternatives are considered in this group:

- **L1-T:** Improving the Meridian Street Corridor from New Rd. to US 40, and S. Franklin Rd. from US 40 to Davis Rd and truck traffic control.
- **L2-T:** Improving the Franklin Street Corridor from New Road to Davis Road and truck traffic control.
- **L3-T/L4-T:** Improving the CR400E Corridor from Davis Road to New Road and truck traffic control.
- **L5-T:** Improving the Blue Road Corridor from US 40 to New Road and S. Morristown Pike Corridor and truck traffic control.

Initial analysis of alternatives L1-T, L2-T, L5-T, and L3-T/L4-T included relocating SR 9 to the respective corridor and adding additional travel lanes for the increase in the heavy vehicle traffic that will incur as a result of truck restrictions along State Street. However, these major off-route improvements resulted in numerous relocations and impacts to wetlands, stream crossings, floodplains, and prime farmlands. Revisions were made so that improvements

would consist only of a non-State, local route upgraded with a pavement overlay and shoulder widening. These minor improvements would provide adequate conditions for the heavy vehicle traffic that would be diverted from SR 9.

L1-T, L2-T, L5-T, and L3-T/L4-T have similar characteristics to one another; relatively lower construction cost ($5,700,000 to $8,800,000), good access due to their location on the existing street system, and diversion of truck traffic from downtown. L5-T and L1-T provide less accessibility and require more travel time than L2-T and L3-T/L4-T. L2-T, however, runs through an extensive residential area. Alternatives L1-T and L3-T/L4-T require a short "jog" along SR 40.

Summary of Final Screening

A study and evaluation of the alternatives continuing on to final screening indicate that there is not one ideal alternative to improve the level of service and safety along SR 9 in the study area. A summary of the Final Screening Analysis of Alternatives is found in Table II.

As a result of the final screening analysis, the following alternatives have positive benefit/cost ratios for meeting the needs of the SR 9 corridor.

- Alternative L1-T: Improving the Meridian Street Corridor from new Road to US 40 and South Franklin Road from US 40 to Davis Road and Truck Traffic Control.
- Alternative L5-T: Improving the CR400E Corridor from Davis Road to New Road and Truck Traffic Control.
- Alternative L3-T/L4-T: Improving the Blue Road Corridor from US 40 to New Road and S. Morristown Pike Corridor and Truck Traffic Control.

Table II - Summary of Final Screening Analysis of Alternatives

Alternative	Description	Length (Miles)	Screening Criteria											
			Primary	Secondary										
				Environmental Consequences										
			Meets Purpose and Need	Relocations	Historic Structures	Hazardous Materials Sites	Wetlands (acres)	Stream Crossings	Floodplains (acres)	Prime Farmland (acres)	Decreases Truck Traffic on State Street (SR 9)	Provides I-70 Detour	Time Required to Implement (Years)	Affordability (Estimated 2005 Construction Cost, millions)
Alternative Group 1 - No Action		0	N	N	0	0	0	0	0	0	N	N	0	0
Alternative L-11 (Major On-Route Improvements - State System No-Build)														
One-way pair, north-south, parallel to SR 9, Davis Rd. to McKenzie Rd. (Convert a local street to one-way north, construct connectors, and add lanes to the remainder).		2	Y	65	2	10	0	2	6	0	N	N	6	$7.3
Alternative GHI (Major Improvements to Existing SR 9)														
Additional travel lanes on SR 9 on three critical segments from CR 100S to I-70		2.5	Y	138	7	18	0	2	6	0	N	N	8	$7.1
Alternative E1 (Major Off-Route Improvements)														
A limited access bypass to the east of Greenfield, from SR 9 near E200S to I-70		6.0	Y	15	0	0	0.41	7	21	203	N	N	10	$34.2
Minor Off-Route Improvements with Truck Traffic Control (State System No-Build)														
L1-T	Meridian St. Corridor - New Road to US 40, with S.Franklin Rd. and Davis Rd. to SR 9, 1 mile south. Shoulder widening and overlay.	5.7	Y	0	0		0	1	0.5	1	Y	Y	5	$6.8
L2-T	Franklin Street Corridor - New Road to Davis Road. Shoulder widening and overlay.	5	Y	21	0	2	0	1	0.5	1	Y	Y	5	$6.0
L5-T	CR 400E Corridor - Davis Road to New Road. Shoulder widening and overlay.	7.4	Y	3	0	0	0.7	8	17	2	Y	Y	5	$8.8
L3-T and L4-T	Blue Road Corridor - US 40 to New Road and S.Morristown Pike Corridor. Shoulder widening and overlay.	4.8	Y	5	0		0.2	3	5	3	Y	Y	5	$5.7

Recommendations

Traffic modeling and analyses indicate that improvements to the existing SR 9 corridor do not significantly reduce the traffic volumes along SR 9 through Greenfield. Additionally, the bypass alternatives did not prove to be the more beneficial of alternatives and, in fact, did not even pass through the final screening process. This is not to discount the fact, however, that there are continuing congestion and safety issues along SR 9 in the Greenfield vicinity.

Existing development make the majority of the alternatives difficult to implement or very costly. As noted previously, one possible solution may be to reroute the truck traffic from a portion of SR 9 thereby increasing the level of service, improving safety, and reducing pollution, noise, and disruptions in the downtown area. Since truck traffic cannot be restricted on a state route, the establishment of a truck route would be the City's responsibility and would require coordination with INDOT. In addition, the truck routing alternatives are off-system projects and are not eligible for state funding. These alternatives, however, are eligible, as local projects, for the federal funding set out in TEA-21 and SAFETEA-LU.

Funding to improve the SR 9 corridor was earmarked in both the 1998 TEA-21 and the 2005 SAFETEA-LU transportation bills. The federal funding available for design and construction would total $2,862,500 and require, as a minimum, a 20% match. Therefore, a project having a cost of up to $3,578,125 could be funded through utilization of these funds. Unfortunately, the construction cost of the truck routing alternatives range from $5.7 to $8.8 million and would require a local match of at least $2.8 million.

Minor, on-system alternatives such as improving intersections by adding/extending turn lanes, signal timings, radius improvements along existing SR 9 through Greenfield can be implemented independently and would help to improve traffic conditions immediately. In addition increased local mobility can be addressed independently through the implementation of improvements to the county roads and local streets. However, none of these improvements satisfy the Purpose and Need of improving both congestion and safety on SR 9.

Based on the results of the screening process, the evaluation discussed above, and the funding constraints put forth, there are no viable "build" alternatives within the state system that can be recommended for further study. Therefore, the **No Action** alternative; no additional actions aside from existing committed (programmed) projects on either State or local roadway systems, is the recommended alternative.

This is not to say that there are no solutions. The truck traffic rerouting alternatives would be viable solutions as projects developed by a local entity and constructed with innovative financing or Local Federal Aid funds. For example, a Group III community such as Greenfield can receive up to $2.5 million per year in Federal Surface Transportation Funds (STP). Three local projects emerge from final screening of alternatives that meet the purpose and need of reducing congestion and improving safety in the SR 9 Corridor:

- Alternative L1-T: Improving the Meridian Street Corridor from new Road to US 40 and South Franklin Road from US 40 to Davis Road and Truck Traffic Control.
- Alternative L5-T: Improving the CR400E Corridor from Davis Road to New Road and Truck Traffic Control.
- Alternative L3-T/L4-T: Improving the Blue Road Corridor from US 40 to New Road and S. Morristown Pike Corridor and Truck Traffic Control..